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(54) **RETENTION MECHANISM FOR VEHICLE
WHEEL ASSEMBLY**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,893,960 A 1/1990 Beier

5,353,890 A 10/1994 Clohessy
5,366,300 A 11/1994 Deane
5,443,316 A 8/1995 Deane
5,740,895 A * 4/1998 Bigley 192/69.41
5,984,422 A 11/1999 Seifert
6,082,514 A * 7/2000 Averill 192/69.42
6,089,673 A 7/2000 Wiacek
6,109,411 A 8/2000 Bigley
6,170,628 B1 * 1/2001 Bigley 192/69.41
6,234,289 B1 * 5/2001 Baker et al. 192/69.41

OTHER PUBLICATIONS

Internet Web Pages: <http://www.joiningtech.com/Friction.htm>, <http://www.tiac.net/users/nctinc/index.html>, http://www.tiac.net/users/nctinc/net_narr.htm, http://www.tiac.net/users/nctinc/net_char.jpg.

* cited by examiner

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(57) **ABSTRACT**

A wheel end assembly including a live spindle secured to a wheel hub at an outboard end. A bearing surrounding the spindle and abutted against a shoulder on the spindle. Said bearing preloaded by a retention structure that slidably engages the bearing to compress the bearing against the shoulder. A clutch ring slidably engages splines associated with the live spindle and with an axle portion to connect and disconnect the axle to the live spindle and accordingly the wheel hub.

2 Claims, 11 Drawing Sheets

